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PREDICTION OF GRADUATION FROM ACADEMIC REMEDIAL TRAINING, (U)
JUL 73 A HOIBERG, C J HYSHAM, N H BERRY

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Anne HOIBERG,
C. J. HYSHAM
N. H. BERRY

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Abstract

Since the establishment of the Academic Remedial Training Division in 1967 at Naval Training Center, San Diego, 1518 recruits have been assigned to the program after having failed the initial academic test during the third week of training. Biographical variables, aptitude scores, a personal history questionnaire (RTS), initial reading level, and odds-for-effectiveness scores were related to the criterion of completing ART or not graduating from the school. For the validation sample, the five variables of total RTS, initial reading level, ARI, age and responding that one does not think he is mentally ill were found to be predictive of ART graduation ($R = .384$). When applied to the cross-validation sample, the resultant r was .311. The most powerful predictor of graduation was RTS. Characteristics of non-graduates ($N = 310$) were compared with graduates ($N = 1208$) and with a control group of recruits not assigned to the school ($N = 1520$). Non-graduates were significantly different from the other two subsamples for most of the characteristics. Initial and final reading levels were significantly lower for non-graduates than for graduates. In comparing recruit characteristics from 1967 to 1972, it was found that changes in selection have occurred. The results of this study indicated that a measure, such as the RTS, should be included in the selection techniques presently used.

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PREDICTION OF GRADUATION FROM ACADEMIC REMEDIAL TRAINING

Anne Holberg
Navy Medical Neuropsychiatric Research Unit
San Diego, California 92152

C. J. Hysham
Naval Training Center
San Diego, California

and

N. H. Berry
Navy Medical Neuropsychiatric Research Unit
San Diego, California 92152

Throughout the last three decades, many branches of the military have established academic remedial training programs to help recruits who have difficulty in completing the academic requirements of recruit training. During times of national emergency, these classes have been particularly important in providing assistance for the marginal recruit who entered the military to fill the increasing needs for more men. At these times, the literacy qualifications were frequently modified in response to our increasing manpower needs. Prior to August 1942, for instance, the requirement was the capacity to read and write at the fourth grade level; however, after that date the admittance of men into the Army was changed to include the sole qualification that men would be inducted who had the intelligence to absorb military training (King and Brown, 1969). As would be expected, special training programs were initiated at many training units during World War II and during the Korean and Vietnamese conflicts.

In 1967, an Academic Remedial Training Division was established at the Naval Training Center, San Diego, California as an effort to raise the literacy of the enlistee who had difficulty absorbing military training because of a reading disability. The recruit who is unable to pass his first academic test during the third week of training is referred to the remedial training school for an assessment of his reading skills. If his reading level is measured on the Gates-MacGinitie Reading Test at or below that for fourth grade children,

he can be accepted into the remediation program. The goal of this program is to help the enlistee function more effectively and safely in relation to his environment, his shipmates, and to himself. In addition, the abilities acquired from this program would presumably improve the enlistee's self-esteem and self-confidence, and, in extending these benefits further, the recruit's military and social endeavors.

Since the inception of this program at San Diego, approximately 250 recruits per year, or 1518 recruits from April 1967 to September 1972, have been assigned to the Academic Remedial Training Division (ART). Even though the goal of this program has been designed to benefit both the recruit and the Navy, the costs of this program involve large expenditures for housing, feeding, and instructing these recruits for an average of five weeks removed from the usual training schedule. In addition, many recruits have been recommended for acceptance into the school; however, the scarcity of available space has limited the number of men who can be assigned to the school.

To attain the highest and best utilization of this program, it is necessary to examine those variables which are related to completion of ART. The purpose of this study, therefore, is threefold: (1) to identify those recruit characteristics which are predictive of completion of ART, (2) to explore which variables distinguish those recruits assigned to ART from men not attached to the school, and (3) to examine the changes in selection which may have occurred over the years since the establishment of ART. The determination of these predictive characteristics, as well as the identification of variables which differentiate those men assigned to ART from men not attached to the school, could subsequently be used to develop a technique to select those recruits who will benefit most from the program.

Method

Subjects. The sample for this study consisted of 1518 recruits who attended ART and 1520 recruits who were not assigned to the school. The recruits in the control group were selected from the same companies as those in the experimental group. For the experimental group 1208 successfully completed the academic remedial training program and 310 recruits did not graduate from ART. The number of recruits who were accepted into the program for each of the six years from April 1967 to September 1972 included the following: 147, 206, 282, 281, 283, and 319.

Data collected. Recruit information collected for this study included: (1) present age, (2) years of education completed, (3) Armed Forces Qualification Test score (AFQT), (4) General Classification Test score (GCT), (5) Arithmetic Reasoning Test score (ARI), (6) Mechanical Aptitude Test score (MECH), (7) total score for the Recruit Temperament Survey (RTS), (8) initial reading level based on the Gates-MacGinitie Reading Test, (9) final reading level based on the Gates-MacGinitie Reading Test, (10) Odds-for-effectiveness score, and (11) responses to the following questions from the RTS:

- (a) Have you ever been in jail, reform school, or detention home?
- (b) Have you ever been charged with or suspected of a felony or a crime?
- (c) Have you been expelled or suspended from school more than once?
- (d) Have you ever been a patient in a mental hospital?
- (e) Do you think you are mentally ill?
- (f) Have you ever tried to commit suicide?

Recruit Temperament Survey (RTS). This inventory, which consists of 115 yes-no personal history statements, was developed by Waite and Barnes (1968) for the psychiatric screening of all recruits entering training at Great Lakes and San Diego. Responses which indicated the presence of a personal problem or an adjustment difficulty were scored as 1, the absence of the same was scored as 0.

To obtain a total RTS score, all of the "I" responses were summed. According to Waite and Barnes, a total RTS score less than 40 would be indicative of a greater likelihood of a recruit's successful completion of his tour of duty than a recruit's total RTS score of 40 or more. It should be noted, however, that the RTS has not been operationally implemented as a predictor of successful completion of a man's first tour of duty. Research upon the utility of the RTS for purposes of selection and prediction of effectiveness is presently being conducted.

Gates-MacGinitie Reading Test. This instrument was administered to all recruits who were sent to ART for testing after failing to pass the initial academic test during recruit training. Two scales were used from the test for the screening, the vocabulary and comprehension subtests. Scores for these two subtests were converted into reading levels expected for school children.

Odds for Effectiveness. Four recruit characteristics were entered into equations to mathematically determine a man's odds or chances in 100 that he will effectively complete his four-year tour of duty. The four variables, which were needed to compute the odds-for-effectiveness score, included (1) Armed Forces Qualification Test (AFQT), (2) years of education completed, (3) number of expulsions or suspensions from school, and (4) number of arrests for reasons other than traffic violations. The odds for effectiveness were developed by Plag and Goffman (1969) and have been compiled into actuarial tables which provide the recruiter with a basis to either select or reject an applicant on the strength of his chances for effective completion of his first tour of duty.

Criterion. This study was designed to explore those recruit characteristics which were predictive of the criterion of completion of, as opposed to termination from, the academic remedial training program. Graduates from ART were assigned a criterion value of 1 whereas a score of 0 was given to recruits who did not complete the program.

Analyses. In determining the predictive validity of the variables as related to the criterion, a three-step process was employed. First, the recruit characteristics were entered into a computer program (Nute and Beck, 1968) which computes correlation ratios (etas) for each of the variables in the validation sample. Criterion weights were assigned to each unique level of a predictor and these variables were then entered into the second step of the process or the step-wise multiple regression analysis. This analysis was designed to successively delete variables which do not contribute significantly to the regression equation. The base score equation from the validation sample was applied to the cross-validation sample to complete the third step of the process. Comparisons of the means for the recruit characteristics were conducted to determine if there were significant differences in the means (t-test values) for non-graduates, graduates, and controls of ART.

Results

Recruit Characteristics Predictive of Completion of ART

For those recruits who were assigned to ART, 1208 successfully completed the program and 310 did not graduate from ART. This sample of 1518 was randomly divided into validation and cross-validation subsamples; basis for this division was either completion of or termination from ART. As stated in the analysis section, eta correlation ratios were computed by relating all of the recruit characteristics with the dichotomous criterion and criterion weights were assigned to each section of a variable. These linearized predictors were then entered into the step-wise multiple regression analysis. For the validation sample, a combination of five significant predictors resulted in a multiple R of .384. When the base score equation for the five variables of age, ARI, initial reading level, total RTS score, and the response that a recruit does not think that he is mentally ill, was applied to the cross-validation sample the resultant r was .311. Higher

scores for ARI, higher reading grade level, lower total RTS score, ages between 18 and 22, and replying that one does not think that he is mentally ill were found to be predictive of completion of ART. The most powerful predictor of all the variables, however, was total RTS score.

Differences in Recruit Characteristics Among the Three Subsamples

Table 1 presents the means and t-test values for the characteristics of the three groups comprising this sample (non-graduates, ART graduates, and controls not assigned to ART). These data indicated that significant differences were obtained in the comparisons of non-graduates with graduates and between non-graduates and controls. Fewer significant differences between mean recruit characteristics occurred for the comparisons of graduates with controls. Non-graduates were distinctively different from the other two subsamples in that they had completed fewer years of education, had lower scores for ARI, had higher total RTS scores, and had indicated that they had been jailed, had been in a mental institution, had thoughts that they were mentally ill, had attempted suicide, and had been expelled or suspended from school more than the other recruits in the sample. The mean reading level on both the initial and final Gates-MacGinitie conversions was significantly lower for the non-graduates in comparison with the reading levels for the graduates. The recruits in the control group had completed more years of education, had higher scores for AFQT, GCT, ARI, and lower total RTS scores, and had the highest odds-for-effectiveness scores of the three subsamples.

(Insert Table 1 about here.)

Differences in Recruit Characteristics of Men Assigned to ART Across the Six Years of Its Existence

The sample was divided into each of six years and the means and standard deviations were computed for the recruit characteristics within each year of ART's existence. As can be seen in Table 2, many changes have occurred over the years.

The t-test values indicated that from 1967 to 1972 the mean age has decreased whereas educational attainment and scores for AFQT, GCT, and ARI have increased. Difficulties with the police and in school have also increased over the years. Mean total RTS scores were not significantly different from 1967 to 1972; however, it should be noted that these scores are substantially higher than mean RTS scores computed for recruits at San Diego. Mean total RTS scores for recruits at San Diego from 1967 to 1972 were within the range of 25 to 29. Mean initial and final reading levels were at a higher level in 1972 than in 1967 and the mean gain in reading level has improved from .8 of one grade in 1967 to 1.3 grades in 1972. These results indicated that gradual changes in selection have occurred over the years of ART's existence.

(Insert Table 2 about here.)

Discussion

The assignment of recruits to ART is presently made on the basis of a recruit's failure to pass the academic requirements of recruit training during the third week of training. During the initial interview at ART, a recruit's attitude toward reading, his reading level, cognitive scores, and years of educational attainment are considered before he is assigned to the school. When a recruit is accepted into the remedial program, it is anticipated that he will steadily improve his reading skills during his five-week stay within this supportive environment. One of the difficulties encountered within the school is that of the recruit who is seeking a means to be discharged from the Navy and he is, therefore, not motivated to eagerly participate in the program. Motivation to succeed in any program or profession has been difficult and elusive for psychologists to measure even with all of their sophisticated techniques and instruments. The results of this study, however, may provide a means of improving the existing means of selection to ART and may also add some knowledge to the understanding of

motivation. In addition, a followup study of these men is planned to determine their rates of effectiveness, that is, successful completion of their enlistments after graduation from ART and throughout their first tours of duty.

The major differences between those who graduated from ART and those who did not complete the program indicated that graduates had completed more years of education, had higher scores for ARI, and had higher initial and final reading levels. Graduates also stated that they had fewer expulsions or suspensions from school, had been jailed less, and had fewer adjustment problems than non-graduates. The total score for RTS, which reflects difficulties with personal problems and adjustment, was significantly lower for the graduates as compared with the RTS scores for non-graduates. These variables, when comprised into a profile of an individual, present the picture of the non-graduate who appears to encounter difficulties in most endeavors--school, society, and with his own feelings of self-worth and his abilities to adjust. It should be noted that his scores for AFQT, GCT, and MECH do not differ from those of the graduate of ART. His difficulties, therefore, cannot be attributed to mental capacity, but seem to encompass a concern with personal problems and inabilities to adjust.

The RTS reflects many of the qualities which are related to personal adjustment and feelings of well-being. The findings of this study, furthermore, indicated that total RTS score was the most highly predictive variable of graduation from ART. Selection of recruits into ART, therefore, should include a measure of the recruit's ability to adjust to his environment or it should reflect his motivation or "stick-to-itiveness." The RTS appears to be a measure of these qualities and should, therefore, be considered as an addition to the selection techniques presently used.

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Footnote

This study was proposed by Captain Allen McMichael, on the Staff of the Chief of Naval Training, Naval Air Station, Pensacola, Florida 32508. The opinions expressed are those of the authors and are not to be construed as necessarily reflecting the official policy of the naval service.

Table 1

Comparisons of Recruit Characteristics for Non-graduates, Graduates, and Controls

Variable	Subsample 1 Non-graduates of ART \bar{X}	Subsample 2 Graduates of ART \bar{X}	Subsample 3 Controls from RTC \bar{X}	t-test t_{12}	t-test t_{13}	t-test t_{23}
Present age	19.23	19.20	19.04	0.28	1.94	2.79**
Years of education	10.59	10.94	11.24	-3.58***	-7.52***	-5.49***
AFQT	18.54	19.79	20.86	-1.77	-3.23**	-2.34*
GCT	32.90	32.27	38.41	1.79	-11.33***	-22.23***
ARI	37.58	38.71	41.73	-3.45***	-11.22***	-13.46***
MECH	42.94	43.16	42.94	-0.48	0.00	0.79
Total RTS score	43.78	35.49	31.79	7.91***	11.55***	6.22***
Odds for effectiveness	69.70	71.18	72.92	-1.55	-3.47***	-3.02**
Having been jailed	0.24	0.17	0.18	2.65**	2.60**	-0.22
Charged with crime	0.13	0.11	0.10	0.83	1.57	1.11
Expelled or suspended	0.26	0.18	0.18	3.25**	3.35***	-0.03
Mental hospitalization	0.04	0.02	0.01	2.39*	4.16***	1.84
Thinks one is mentally ill	0.10	0.03	0.02	5.46***	6.61***	0.77
Attempted suicide	0.08	0.03	0.02	4.23***	4.91***	0.45
Initial reading level	3.22	3.91	--	-10.86***	--	--
Final reading level	3.46	4.93	--	-12.00***	--	--

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2

Characteristics of Recruits Assigned to ART from 1967 to 1972

Variable	1967 \bar{X}	1968 \bar{X}	1969 \bar{X}	1970 \bar{X}	1971 \bar{X}	1972 \bar{X}	1972-1967 t-test
Present age	19.78	19.38	19.21	18.95	19.01	19.20	-3.34***
Years of education	10.24	10.72	10.69	10.88	11.28	11.04	5.16***
AFQT	16.51	16.35	17.68	19.91	21.38	22.93	5.93***
GCT	31.63	32.43	31.81	33.15	31.99	32.95	2.32*
ARI	37.35	38.01	38.22	38.71	38.96	39.01	3.49***
MECH	44.03	42.68	42.19	44.05	42.68	43.32	-0.98
Total RTS score	35.55	38.42	35.15	39.78	35.30	38.11	1.50
Having been jailed	0.15	0.16	0.18	0.18	0.18	0.23	1.98*
Charged with a crime	0.06	0.10	0.11	0.11	0.10	0.16	3.04**
Expelled or suspended	0.16	0.19	0.13	0.20	0.18	0.27	2.48*
Mental hospitalization	0.03	0.02	0.02	0.03	0.01	0.03	-0.14
Thinks one is mentally ill	0.04	0.04	0.03	0.03	0.04	0.05	0.43
Attempted suicide	0.03	0.04	0.02	0.03	0.02	0.06	1.38
Initial reading level	3.25	3.05	3.49	3.91	4.16	4.28	10.30***
Final reading level	3.87	3.66	4.14	4.96	5.55	5.54	11.08***
Reading improvement	0.84	0.73	0.75	1.19	1.51	1.31	3.51***

* $p < .05$; ** $p < .01$; *** $p < .001$

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